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ELM

. . . *an American wood*

The elms are one of the important commercial hardwood families in the United States. Six species—American, slippery, rock, winged, cedar and September elm—grow in the United States, but only American, slippery, and rock elm are of great commercial importance. The heartwood is light brown to brown and the sapwood is all white. The wood is moderately heavy, hard, and stiff; ranks high in shock resistance; and has excellent bending qualities. However, it has high shrinkage and a tendency to warp and twist upon drying. It is used principally for furniture, flooring, boxes and crating, construction and mining timbers, sheet-metal work, sporting goods, slack cooperage, vegetable-box and basket veneer, and the manufacture of plywood, pulp and paper. The Dutch elm disease, causing extremely heavy losses of both shade and forest trees, may severely reduce future sawtimber.

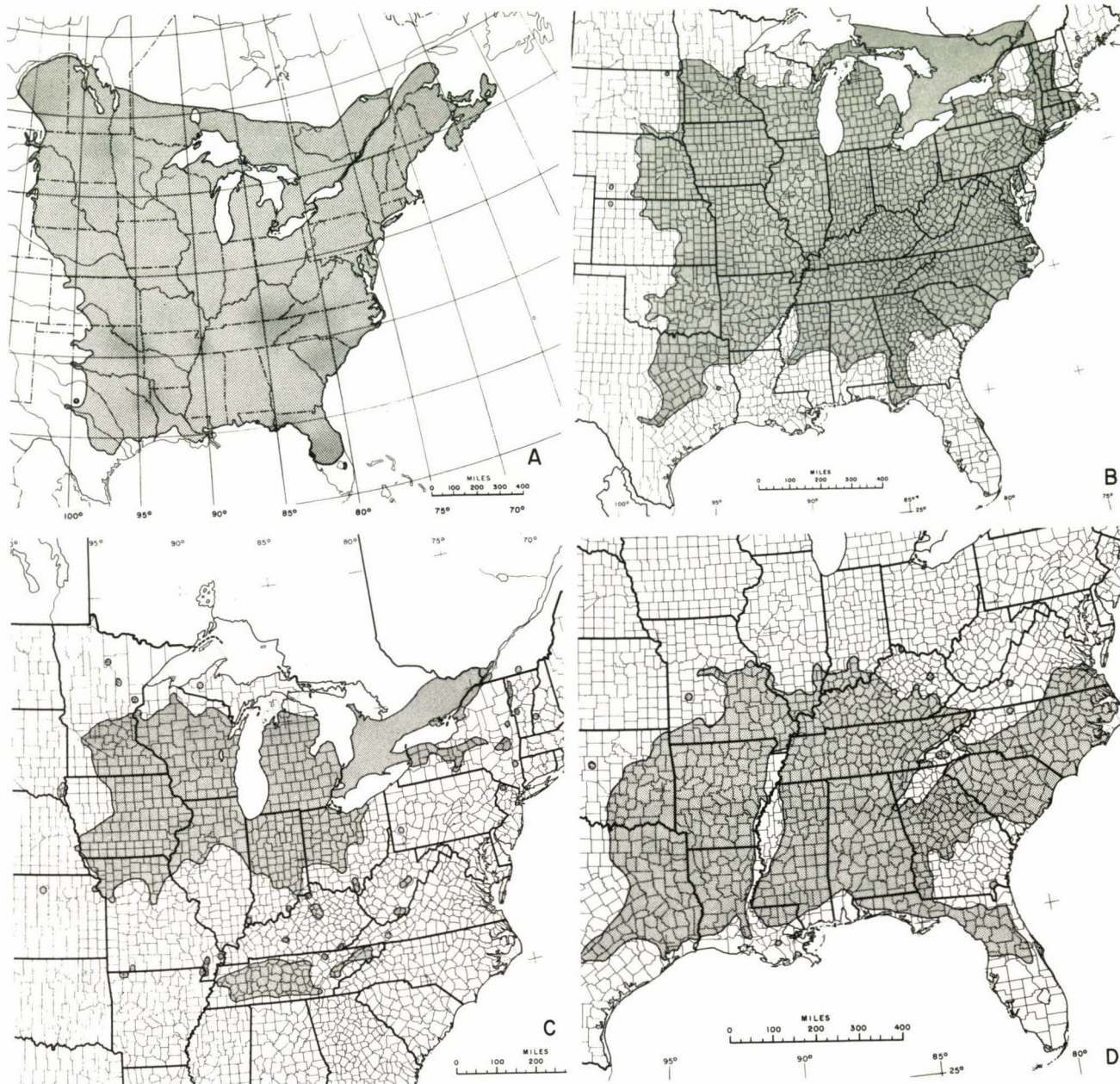


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Figure 1.—Natural range of American elm (A), slippery elm (B), rock elm (C), winged elm (D).

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ELM

an American wood

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DISTRIBUTION

Of the six species of elms (*Ulmus Species*) native to North America—American, slippery, rock, winged, cedar, and September—American elm is the best known and most important. It grows throughout eastern North America from Newfoundland across southern Canada to the Rocky Mountains and south to Texas and northern Florida (fig. 1A). The range of slippery elm is similar to that of American elm but does not extend as far north, west, or south (fig. 1B); while rock elm is restricted to the northern portion of American elm's range (fig. 1C). These three species are the most important commercially. The three less commercially important species—winged elm, cedar elm, and September elm—grow in the southeastern United States. Winged elm's range extends from southeastern Virginia to southern Missouri and south to central Florida and eastern Texas (fig. 1D). Cedar elm grows in Mississippi, southern Arkansas, and Texas; while September elm occurs from eastern Kentucky to southern Illinois and south to northeastern Georgia and eastern Oklahoma.

American elm is commonly found in association with green ash, red and silver maple, sugarberry, sycamore, and pecan. It is a major component of four forest types and a minor component of several others. The other five elm species are minor components of several forest types.

The elms generally grow best on well-drained, loamy soils found in bottomlands, moist lower

slopes, and along streambanks. However, they can grow on a variety of sites, and the present distribution of elm may be governed more by competition with other tree species and by past logging activities than by the inherent suitability of the sites for elm.

DESCRIPTION AND GROWTH

American elm is the most easily recognized of the elms because of its distinctive shape and its widespread occurrence as a shade tree. The bole of the open-grown tree often divides into several large, erect branches, forming a vase-shaped crown. American elm matures in 150 years, and generally is 80 to 100 feet tall and 2 to 3 feet in diameter. Slippery elm and rock elm are slightly smaller trees, reaching 60 to 70 feet in height; while the other three species seldom exceed 50 feet. The bark of American elm is grayish with flat-topped ridges (fig. 2). The bark of the other species is similar but often contains reddish streaks.

Cedar elm and September elm flower in the fall. The seeds mature and are dispersed during October and November and germinate the following spring. The other four species flower in the spring. Their seeds mature and are dispersed during the period of leaf development and germinate during the same spring. Wind is the principal agent for seed dispersal, although some seeds are carried considerable distance by water.

Elm leaves are alternate, single, and either singly or doubly serrate. Both leaves and seeds are similar in form for all species, resembling those of American elm shown in figure 3. Species differences are mainly in size.

The elms are normally found in mixtures with other species, and therefore growth and yield data

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NOTE: This publication supersedes unnumbered publication *Elm*, issued 1945.



Figure 2.—Bark of American elm.

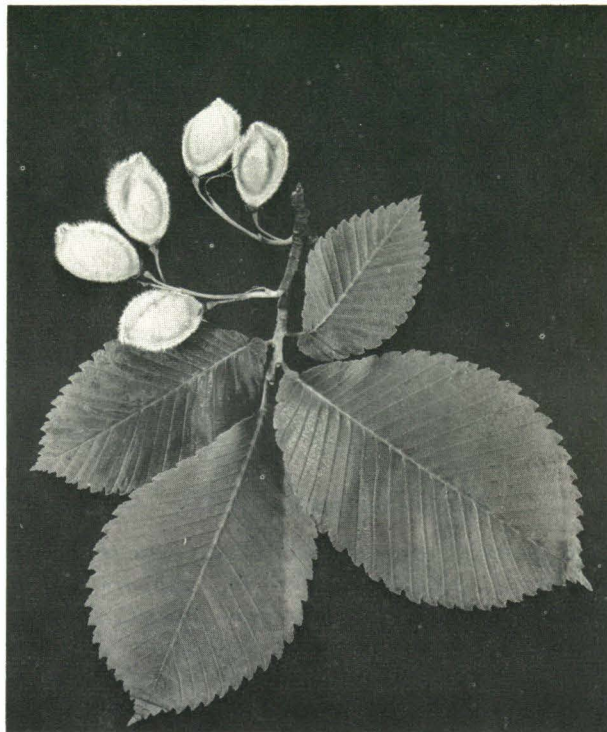
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are not available on a per-acre basis. American elm may develop a clear bole 50 to 60 feet in length in a dense stand, and it is a relatively rapidly growing tree as long as it maintains a dominant position in the stand. Rock elm is particularly notable for its ability to recover after prolonged suppression, but becomes less tolerant of competition with age. It has the strongest tendency to produce a single stem of all the elms. The other four species are more sensitive to competition, although all the elms are rated as intermediate in tolerance and are relatively slow-growing trees.

There is a large number of diseases that attack the elms. The two major ones are Dutch elm disease (*Ceratocystis ulmi*) and phloem necrosis (*Morsus ulmi*). Although most serious on shade trees, Dutch elm disease could conceivably greatly reduce the future supply of elm timber. Some control of the disease is presently possible for individual trees, but control measures that could be applied to extensive forest areas are not available.

COMMON AND SCIENTIFIC NAMES

American elm (*Ulmus americana* L.) is also known as soft elm, water elm, and white elm. Rock elm



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Figure 3.—Typical leaves and seeds of elm species.

(*Ulmus thomasi* Sarg.) may be called cork elm, while slippery elm (*Ulmus rubra* Mühl.) is called gray, red, or soft elm. Other names for winged elm (*Ulmus alata* Michx.) are cork elm and wahoo. Red elm is also used for September elm (*Ulmus serotina* Sarg.) and for cedar elm (*Ulmus crassifolia* Nutt.), and the latter is also known as basket elm.

RELATED COMMERCIAL SPECIES

There are no other species marketed as elms.

SUPPLY

The stand of elm of sawtimber size in the United States is roughly estimated at about 16.8 billion board feet. About 65 percent of the total stand is in the Eastern region, about 31 percent is in the Southern region, and the remainder is in the Rocky Mountain and Northern regions. The States having stands of elm which exceed one billion board feet are, in decreasing order, Michigan, Wisconsin, Minnesota, Iowa, and Louisiana.

PRODUCTION

The maximum production of elm lumber (457 million board feet) occurred in 1899, the first year

for which statistics for elm lumber were recorded separately (fig. 4). Since then, production of elm lumber has decreased to a low of 20 million board feet in 1932, a year of business depression. From 1940 to 1950 there was a recovery in elm lumber production. By 1950 the production had increased to about 200 million board feet. The production of elm lumber has maintained that level for the last two decades. Current production is only about 1.2 percent of the stand of elms of sawtimber size in the United States.



Figure 4. — Lumber production of elm (*Ulmus* species).

CHARACTERISTICS AND PROPERTIES

The heartwood of elm is light brown to brown, frequently with a reddish tinge, and the sapwood is nearly white. The wood is ring-porous, generally without characteristic odor or taste. The annual rings in American elm and slippery elm are wide and distinct and form a pleasing figure in plainsawed lumber (fig. 5). In rock elm the annual rings are narrow and not as distinct (fig. 6). In American elm the sapwood is thick, while in slippery elm and rock elm the sapwood is relatively thin.

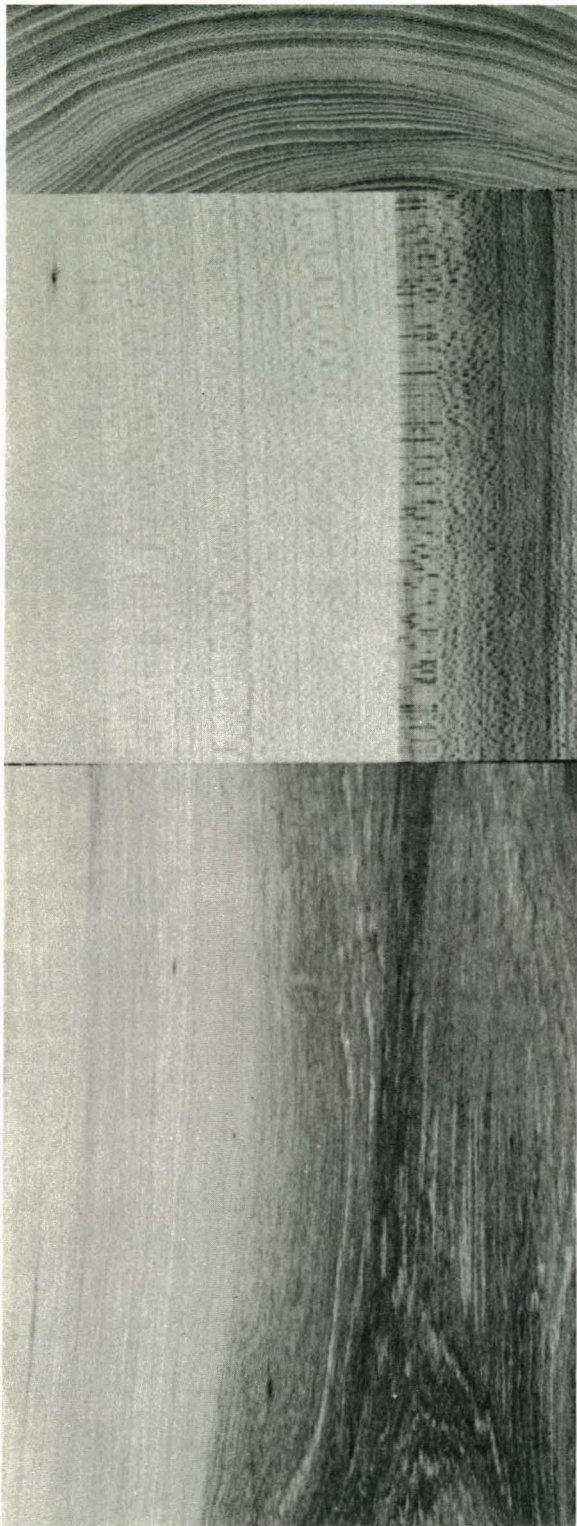
American elm and slippery elm are moderately heavy, hard, and stiff. Although all elms have a high degree of shock-resisting ability and excellent bending quality, rock elm is somewhat heavier and ranks above American elm and slippery elm in strength, hardness, and shock resistance. American elm and rock elm are difficult to split due to their interlocked-grain structure.

All three of the commercial elms are only moderately resistant to decay. Slippery elm is classified as easy to impregnate with preservatives, while rock elm is classed as difficult to penetrate. The elms



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Figure 5. — Wood of American elm: top—transverse view; middle—radial view; and bottom—tangential view (plainsawed).



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Figure 6.—Wood of rock elm: top—transverse view; middle—radial view; and bottom—tangential view (plainsawed).

require great care in drying because of their great tendency to shrink, warp, and twist.

American elm and slippery elm are commonly marketed as soft elm, while rock elm is marketed as hard elm.

PRINCIPAL USES

In the past, elm was used principally for containers such as boxes, baskets, crates, cheeseboxes, and slack cooperage; furniture; dairy, poultry, and apiary supplies; caskets and burial boxes; and vehicle parts. Today, elm is used principally for furniture, hardwood dimension and flooring, boxes and crates, construction and mining timbers, and sheet-metal work. In some cases, the different species of elm are employed indiscriminately; but when hardness or shock resistance is required to a high degree, rock elm is preferred.

The excellent resistance-to-splitting property of elm has made it a choice wood for the manufacture of high-quality hockey sticks, in spite of the fact that metals and plastics have replaced wood in most of the toys and sporting goods previously made of elm.

The manufacture of furniture continues to increase the demand for elm, especially for use in the bent parts of chairs, such as rockers and arms.

In 1965, over 33 million square feet of elm veneer was manufactured. About two-thirds of the veneer was used for making boxes, crates, and baskets; and the rest was used in plywood manufacturing. Its strength, toughness, and bending properties make elm a strong competitor in the crate and box market where heavy-duty crating is a necessity.

Until 1965, only a small quantity of elm was used for pulp and paper manufacture. However, since then it and other hardwoods have been increasingly used for this purpose.

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